

modeled spatial probability of occurrence of foraging. These findings are of considerable importance in the context of regional management and conservation, where spotted dolphins represent a key resource for a local tourism industry that operates in a coastal ecosystem of high biodiversity value.

### Cetacean abundance off the North Carolina coast of the USA

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Onslow Bay, North Carolina, USA, has been identified as a potential site for a US Navy Undersea Warfare Training Range (USWTR). This 1,713 km<sup>2</sup> site, which lies 40-140 km offshore, includes both continental shelf waters and deeper waters off the shelf break. To obtain baseline information on occurrence and density of marine mammals and sea turtles prior to installation of the USWTR, a consortium of academic institutions conducted aerial surveys from September 1998 to October 1999, and synoptic aerial and shipboard line transect surveys from June 2007 to the present. Here we analyze sightings data from September 1998-June 2010. Eight cetacean species/species groups were observed in the site, including *Tursiops truncatus*, *Stenella frontalis*, *Grampus griseus*, *Globicephala* spp., *Delphinus delphis*, *Steno bredanensis*, *Balaenoptera physalus*, and unidentified beaked whales. Only two species (*T. truncatus* and *S. frontalis*) were observed with sufficient frequency to generate density estimates. We obtained estimates of detection probability using distance sampling techniques and then modeled these spatially referenced estimates using generalized additive models. Estimated numbers of *T. truncatus* varied between 80 (95% CI: 0-430, July 1999) to 560 (70-880, April 2010). Estimated numbers of *S. frontalis* varied from 0 (0-0, 1998/99) to 6,100 (200-30,300, March 2009). *S. frontalis* only appeared in the survey region from 2007 onwards. Small sample sizes result in very little power to detect trends in abundance but there was no evidence of a systematic decline for either species over the last ten years and some evidence of an increase in *S. frontalis*. The abundance of both species fluctuated throughout the year, perhaps in response to sea surface temperature. As a result of this research, Onslow Bay is now one of the most intensely surveyed regions along the US mid-Atlantic coast. Overall, marine mammal diversity and densities are extremely low in this area.

### The occurrence of coastal and oceanic bottlenose dolphins off the southern Pacific coast of Costa Rica

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The bottlenose dolphins (*Tursiops truncatus*) is the second most commonly encountered odontocete off the southern Pacific coast of Costa Rica, after the coastal pantropical spotted dolphin (*Stenella attenuata graffmani*). The species occurs beyond the 200 m isobath off Osa Peninsula, with frequent incursions to coastal waters.

Bottlenose dolphins are also frequently sighted within inshore habitats of Golfo Dulce. This study examines the spatial distribution pattern of both ecotypes by analyzing the sighting records and relative density of bottlenose dolphins in two sub-areas: off Osa Peninsula (2001 - 2006, n= 238) and Golfo Dulce (2005 - 2011, n= 172). Kernel distribution maps were produced and the spatial distribution pattern quantified by means of the near neighbor index. Based on the external morphology of the animals seen and their off-shore / in-shore occurrence, we conclude that all records off Osa peninsula represent the oceanic ecotype (primarily off-shore sightings), whereas the external morphology and inshore presence of bottlenose dolphins in Golfo Dulce fits the known characteristics of the coastal ecotype. The significantly clumped sightings within the in-shore environments of Golfo Dulce indicates a strong preference of this ecotype to shallow water habitats, particularly rivers drainage in the inner basin of Golfo Dulce. Higher relative density over the shelf break along with a non-random clumped aggregation of bottlenose dolphins off Osa Peninsula provides further evidence that these animals are the oceanic ecotype. This data contributes to baseline conservation management strategies that are currently addressing plans of coastal development. Assessment of the occurrence in areas of potential overlap between the ecotypes is currently in progress.

### Audiogram of a stranded Blainville's beaked whale (*Mesoplodon densirostris*) measured using auditory evoked potentials.

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There has been increasing concern over the impact of anthropogenic noise on marine mammals. Man made sounds can alter the animals' behavior or displace them from their habitat. More dramatic consequences include strandings and some species of beaked whales have been reported to mass strand following the use of military sonar, yet the underlying causes remain unclear. While acoustic tagging has started to provide insight on the ecology of these animals, there is still little information about the hearing abilities of beaked whales. This study presents the audiogram of a Blainville's beaked whale *Mesoplodon densirostris* that stranded in Maui in August 2010. During its rehabilitation, the audition of the animal was evaluated and hearing thresholds were measured using non invasive auditory brainstem response techniques. Acoustic stimuli consisted of 11 frequencies ranging from 5.6 to 160 kHz presented as sinusoidally amplitude modulated tones. The overall audiogram was similar in shape to the audiogram of a Gervais' beaked whale and the range of best hearing was found around 40 and 50 kHz with thresholds below 50 dB re 1  $\mu$ Pa at 1 meter. This frequency range was observed to overlap with the frequency spectrum of the modulated echolocation signals produced by this species. This type of study not only provides a rapid diagnostic medical tool to assess the hearing of stranded animals but it also represents a unique opportunity to learn more about poorly known species.

### Trends in Collisions between Vessels and North Pacific Humpback Whales (*Megaptera novaeangliae*) in their Principal Calving Grounds (1975 – 2011)

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